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PORTABLE COMMUNICATIONS DEVICE

Reference to Related Application

This application claims priority from U.S. provisional application Serial No. 60/219,381, filed July 19, 2000, the entire contents of which is incorporated herein by reference.

Field of the Invention

This invention relates to portable communication devices, and, more particularly, to a personal communication device with enhanced hands-free operation capabilities.

Background of the Invention

Consumers long since have become accustomed to the convenience of continuous, ubiquitous availability of communications links, and, as a result, have been hesitant to compromise their access to these types of connections, even when safety would be jeopardized. There are many devices available which provide "hands-free" operation, but they still require the user to perform a variety of activities, such as dialing a telephone number, which represent significant distractions if the user is attempting to drive a vehicle while operating the communication device.

Summary of the Invention

Broadly, this invention provides certain improvements which enhance the use of portable communications devices such as cellular telephones. According to one

embodiment, data storage capacity is added to the device, such that if a "speed-dial" type operation is initiated, the device is operative to announce a pre-recorded message previously associated by the user with that key sequence, such as the number and/or person being dialed.

Another feature enables the user to program a series of telephone numbers before in advance. In this way, the user is able to initiate the dialing of the numbers sequentially, without having to select or key in information for each call while driving.

Yet another aspect of the invention offers the ability to interact with GPS ("Global Positioning Satellite") information. In some scenarios, it may be advantageous to be able to switch the communications link (say, between different carrier services, such as "Air-Touch Cellular" or "Sprint PCS") as the communications device is moved to different locations. Alternatively, the ability to identify its own location enables the device to respond to inquiries from an external stimulus source, by which the location of the device is transmitted back to the external source.

Brief Description of the Drawings

FIGURE 1 depicts a preferred embodiment of the invention.

Detailed Description of the Invention

The instant invention overcomes these obstacles with a variety of features directed towards minimizing the need for user intervention while operating the device. Using a portable telephone as an example of these types of devices, data storage capacity

is added to go beyond the typical application of "remembering" the pre-assigned "speed-dial" numbers. If a "speed-dial" operation is initiated by pressing a particular sequence of key buttons, such as *23, then, in an enhanced unit constructed in accordance with the invention, this prompts the device to announce a pre-recorded message (previously associated by the user with that key sequence), such as "Twenty-three --- John Smith, Office". In this way, the user is able to initiate the call without looking directly at the device keyboard. As an additional feature, the individual keys may be textured so as to allow distinguishing them from each other, using, for example, raised characters or Braille or other symbols.

Another feature enables the user to program a series of telephone numbers before in advance. In this way, the user is able to initiate the dialing of the numbers sequentially, without having to select or key in information for each call while driving. By selecting just a few control keys, it would be possible to skip a number which goes unanswered and return to it later, or delete a number from the sequence after the call has been completed. As an alternative to manual entry, a voice command such as "dial next number" may be used. Furthermore, as opposed to user entry of the numbers to be called, unanswered received calls may also be placed in the queue using caller-ID information. Selection of such a number to be called, or replay of a stored voice message, would preferably be annunciated prior to dialing.

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Figure 1 depicts the various configuration features of the invention in practice. The personal communications device 2 is equipped with a user interface, such as a keypad, and may be supplemented with an external user interface 4, such as a graphical interface, a wireless remote control, a "mouse", or another similar device. The personal communication device typically will include all of the features of a conventional cellular telephone, such as the ability to dial numbers from an internal memory, and automatically seeking a wide-area network connection to carry the conversation. In the implementation of the instant invention, these capabilities would be augmented with additional features, such as voice-synthesis circuitry, enhanced connection-seeking capabilities, and provisions for interfacing with external devices, such as a personal digital assistant (PDA) 6. The user would be able to program the PDA with a list of calls to be placed, and even may provide a schedule specifying when these calls would be initiated; this information then would be transferred to the personal communications device. The PDA may remain continuously attached to the personal communications device through a wired or wireless communication link, or it may download the call information in a single session, and the personal communications device then would complete the designated connections and any calls or tasks that have been specified in a schedule.

Additional facilities optionally may be provided for interconnecting the personal communications device to external devices. As examples, the personal communications device may employ a wireless connection to a local area network (LAN) 8, a direct wired connection to a LAN 10, or a wireless or wired connection to a wide area network (WAN) 12. This connection may be utilized for uploading or downloading data to or from other devices, such as a personal computer, for storage efficiency and convenient access to the many software programs available for consumer and commercial use.

As the user resolves each scheduled call (either by completing the call, or by "skipping" the call if it cannot be completed at the time it is initiated), the user has the choice of deleting the entry for the call, rescheduling it for a later time (either automatically, or for after a delay specified by the user). In addition, the user may use the available memory in the personal communications device as a "dictation machine," providing commentary or reminder notes concerning the subject material of the discussion, or even serving to record the conversation itself in those communities in which it is legal to do so. When an active connection to the PDA is available, then the memory of that device may be accessed for this purpose.

Depending on the particular embodiment, the personal communications device or the PDA may be equipped with removable or non-removable high-capacity storage, to allow extended recording times or note-taking, or for maintaining other records of the conversations, such as a filing system for conversations, notes, and date-stamps of records, that may be accessed in order to review the history of contacts with a particular customer. Where it would be beneficial to do so, a database may be implemented to

organize the various records. In an alternative embodiment, the personal communications device would be enabled to receive facsimile information that could be displayed on the PDA or other user interface display, or printed for hard-copy availability. Annotations, including graphical information or images may be added to these records, using special software similar to that provided for many word processing applications or desktop publishing applications; a data file transmitted over the communication link would be received, stored, and made available for inclusion in the records.

Additional features are available, by utilizing the conventional wireless wide-area telecommunications link 14, either separately or in conjunction with a wireless local area telecommunications link 16. For example, the usual cell-phone link (represented by the conventional wireless wide-area telecommunications link) could be coordinated with a link to a cordless-telephone base station (represented by the a wireless local area telecommunications link). In this case, a user might initiate a telephone call over a terrestrial link (through the cordless telephone base station) and then automatically switch to a cell phone link when the distance from the personal communications device to the cordless telephone base station becomes so great that the signal begins to deteriorate. This deterioration may be monitored by having a "ranging signal" transmitted from either the personal communications device or the cordless telephone base station; in the first case, the signal evaluation might consider factors such as time-of-flight as well as signal strength, while in the second case, signal strength alone would be used. However, other

possible methods of interconnection, such as infrared wireless connections, may be employed.

Once a determination has been made that a new signal path should be sought out, the personal communications device automatically would switch to the best alternative link available. Since two-way communication links, by tradition, have been charged on a per-minute usage basis, it will be advantageous to include economic considerations of the costs of each of the various available links as part of the selection process. In this case, a connection provider would levy charges based on a per-packet fee for carrying the data over its network.

The reverse process would allow a user automatically to transfer a connection established over a cell phone link to a terrestrial link, as soon as the user reaches a location, such as the user's office or home, wherein these alternatives become available. As Internet-based telephony becomes more readily available, it is likely to become another factor in the selection process.

In order to optimize the efficient management of the various possible connection options, it may be advantageous to implement the personal communications device to monitor, on a continuous or periodic basis, the connections currently available at any point in time. In this way, switching between the various connection paths would be accomplished seamlessly, and imperceptibly, from the standpoint of the user. In addition, this would enable dynamic management of bandwidth, temporarily expanding the connection path bandwidth, or adding additional connection paths to facilitate the

transmission of a large file, and later reducing the bandwidth after the file transfer has been completed.

In an alternative embodiment, a portion of the memory would be reserved, to provide “background music” for the benefit of a caller who has been placed “on-hold.”

In yet another alternative embodiment, the information about the location of the personal communications device may be utilized to improve transmission reliability. For example, when the signal strength reduction is sensed as a user carrying the personal communications device enters a tunnel, a warning signal would be transmitted, so that the other party in the conversation is made aware of the impending interruption. Data packets from each end would be buffered, and once the connection again becomes available, the buffers would be emptied as the connection “catches up.”

We claim: